# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
# Shri Vaishnav Institute of Technology and Science
# Choice Based Credit System (CBCS) in Light of NEP-2020
# M.Tech. in Civil with Structural Engineering
# (2021-2023)

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING &EVALUATION SCHEME | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | L | T | P | CREDITS |
| | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* | | | | |
| MTCE 1105(1) | DSE | Theory of Elasticity and Plasticity | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

**Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

**Course Educational Objectives (CEOs):**

1. To impart knowledge of Principal stresses and strains.
2. To develop analytical skills of solving problems using plain stress and plain strain.
3. To impart knowledge of engineering application of plasticity.

**Course Outcomes (COs):**

1. The students shall be able to demonstrate the application of plane stress and plane strain in each situation.
2. The student will demonstrate the ability to analyse the structure using plasticity.
3. To impart the knowledge of stress-strain relations for linearly elastic solids, and Torsion.

**Syllabus:**

**UNIT I** **8 Hrs.**

**Plane Stress & Plane Strain**: Plane Stress; Plane Strain; Stress and Strain at a point; Differential equations of equilibrium; Anisotropic materials; Linear elasticity; Stress, strain, Constitutive relations; Boundary conditions; Generalized Hooke's law; Elastic Constants; Compatibility equation; Stress function.

**UNIT II** **8 Hrs.**

**Two Dimensional Problems in Rectangular Co-ordinates**: Solutions by Polynomials; Saint-Venant's Principle; Determination of displacements; Bending of beams; Solution of two-dimensional problems in Fourier series

**UNIT III** **8 Hrs.**

**Two Dimensional Problems in Polar Coordinates**: General equations in Polar coordinate; Pure bending of curved bars; Analysis of stress and strain in three dimensions; Principal stress and strain; Shearing stress and strains; Elementary equation of equilibrium; Compatibility conditions

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examination
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
## Shri Vaishnav Institute of Technology and Science
## Choice Based Credit System (CBCS) in Light of NEP-2020
## M.Tech. in Civil with Structural Engineering
## (2021-2023)

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING &EVALUATION SCHEME | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | L | T | P | CREDITS |
| | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* | | | | |
| MTCE 1105(1) | DSE | Theory of Elasticity and Plasticity | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

**Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

**UNIT IV** **8 Hrs.**

**Theory of Plasticity:** Basic experiments of monotonic loading tension and compression tests; Loading-Unloading reloading types; Loading-Unloading reverse loading types and their observations; Definition of nominal stress, strain, true stress, natural Strain etc and their relations; Bauschinger's effects; Strain hardening; Stress strain curve and their empirical equations.

**UNIT V** **8 Hrs.**

Stress and strain tensors; Principal stresses and strains; Stress and strain invariants; Maximum and octahedral shear stresses and strains; Stress and strain deviator tensor; assumptions; Yield Criteria like Rankine's, Saint Venant's, Trescas and Von mises and their two-Dimensional representation; Failure Theories.

**Text Books:**

1. Timoshenko, S.P., Theory of Elasticity, McGraw Hill Book Company, 3rd edition 2011.
2. Helena H. Jane, Theory of Elasticity and Plasticity, Publisher: PHI Learning 2017.

**Reference Books:**

1. Theory of Plasticity, J. Chakrabarty, Elsevier/Butterworth-Heinemann, 2012.

| | | | |
|---|---|---|---|
| **Chairperson** Board of Studies Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore | **Chairperson** Faculty of Studies Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore | **Controller of Examination** Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore | **Joint Registrar** Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore |

# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
# Shri Vaishnav Institute of Technology and Science
# Choice Based Credit System (CBCS) in Light of NEP-2020
# M.Tech. in Civil with Structural Engineering
# (2021-2023)

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING &EVALUATION SCHEME | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | L | T | P | CREDITS |
| | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* | | | | |
| MTCE 1105(2) | DSE | Theory of Vibrations | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

**Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

**Course Educational Objectives (CEOs):**

1. To impart knowledge of fundamental principles of vibration theory.
2. To develop analytical skills of solving problems using Newton's second law or energy principles.
3. To determine a complete solution to mechanical vibration problems using mathematical or numerical techniques.

**Course Outcomes (COs):**

1. Students will be able to construct the equations of motion from free-body diagrams.
2. Students will be able to solve for the motion and the natural frequency of a freely vibrating single degree of freedom un-damped motion and a freely vibrating single degree of freedom damped motion.
3. Students will be able to construct the governing differential equation and its solution for a vibrating mass subjected to an arbitrary force.
4. Students will be able to decompose any periodic function into a series of simple harmonic motions using Fourier series analysis.

**Syllabus:**

**UNIT I** **8 Hrs.**

Single degree of freedom system; Free and forced vibrations; Linear Viscous Damper; Coulomb Damper; Response to harmonic excitation; Rotating unbalance and support excitations.

**UNIT II** **8 Hrs.**

Vibration isolation and transmissibility; Single degree of freedom system as vibro-meter and accelerometer; Response to periodic and arbitrary excitation.

**UNIT III** **10 Hrs.**

Duhamel's integral; Impulse response function; Laplace transform Fourier transform methods; Frequency response function; Phase-Plane techniques; Critical speed of rotors; Energy methods; Rayleigh's method; Equivalent viscous damping

| Chairperson | Chairperson | Controller of Examination | Joint Registrar |
|---|---|---|---|
| Board of Studies | Faculty of Studies | Shri Vaishnav Vidyapeeth | Shri Vaishnav Vidyapeeth |
| Shri Vaishnav Vidyapeeth | Shri Vaishnav Vidyapeeth | Vishwavidyalaya, Indore | Vishwavidyalaya, Indore |
| vishwavidyalaya, Indore | Vishwavidyalaya, Indore | | |

# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
# Shri Vaishnav Institute of Technology and Science
# Choice Based Credit System (CBCS) in Light of NEP-2020
# M.Tech. in Civil with Structural Engineering
# (2021-2023)

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING &EVALUATION SCHEME | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | L | T | P | CREDITS |
| | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* | | | | |
| MTCE 1105(2) | DSE | Theory of Vibrations | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

**Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

**UNIT IV** **8 Hrs.**

Two degree of freedom system; Matrix Formulation; Free Vibration; Beat phenomenon; Principle of damped and un-damped vibration absorbers

**UNIT V** **8 Hrs.**

Multi degree of freedom system; Matrix formulation; Stiffness and flexibility influence coefficients; Eigen value problem; Normal modes and their properties; Free and forced vibration by modal analysis.

**Text Books:**


1. Ray W. Clough and Joseph Penzien , Dynamics of structures, McGraw-Hill, New York, 2nd edition, 2015.
2. William Thomson, Theory of Vibration with Applications, Pearson, 5th edition, 2014.


**Reference Books:**


1. Mario Paz, Structural Dynamics: Theory and Computation, Springer Science & Business Media, 5th edition, 2006.
2. Anil K. Chopra, Dynamics of Structures: Theory and Applications to Earthquake Engineering, Pearson Education, 2020


| Chairperson | Chairperson | Controller of Examination | Joint Registrar |
|---|---|---|---|
| Board of Studies | Faculty of Studies | Shri Vaishnav Vidyapeeth | Shri Vaishnav Vidyapeeth |
| Shri Vaishnav Vidyapeeth | Shri Vaishnav Vidyapeeth | Vishwavidyalaya, Indore | Vishwavidyalaya, Indore |
| Vishwavidyalaya, Indore | Vishwavidyalaya, Indore | | |

# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
# Shri Vaishnav Institute of Technology and Science
# Choice Based Credit System (CBCS) in Light of NEP-2020
# M.Tech. in Civil with Structural Engineering
# (2021-2023)

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING &EVALUATION SCHEME | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | L | T | P | CREDITS |
| | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* | | | | |
| MTCE 1105(3) | DSE | Stability Theory in Structural Engineering | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

**Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

**Course Educational Objectives (CEOs):**
At the end of the course, students will be able to

1. Determine stability of columns and frames
2. Determine stability of beams and plates
3. Use stability criteria and concepts for analyzing discrete and continuous systems,

**Course Outcomes (COs):**
Students will be able

1. To analyse the buckling of columns, beam-columns and find critical loads using energy and non-energy methods.
2. To learn the lateral buckling of beams by energy and non-energy methods.
3. To understand the buckling of rectangular plates and find critical compressive loads for various boundary conditions.

**Syllabus:**

**UNIT I** **8 Hrs.**
Buckling of Columns; States of equilibrium; Classification of buckling problems; Concept of equilibrium, energy, imperfection, and vibration approaches to stability analysis; Eigen value problem; Governing equation for columns.

**UNIT II** **8 Hrs.**
Buckling of Beam-Columns and Frames; Theory of beam column; Stability analysis of beam column with single and several concentrated loads; Distributed load and end couples.

**UNIT III** **8 Hrs.**
Torsional and Lateral Buckling; Torsional buckling; Torsional and flexural buckling; Local buckling; Buckling of Open Sections; Numerical solutions; Lateral buckling of beams.

**UNIT IV** **8 Hrs.**
Buckling of Plates; Governing differential equation; Buckling of thin plates; Various edge conditions; Analysis by equilibrium and energy approach; Approximate and numerical techniques

| Chairperson | Chairperson | Controller of Examination | Joint Registrar |
|---|---|---|---|
| Board of Studies | Faculty of Studies | Shri Vaishnav Vidyapeeth | Shri Vaishnav Vidyapeeth |
| Shri Vaishnav Vidyapeeth | Shri Vaishnav Vidyapeeth | Vishwavidyalaya, Indore | Vishwavidyalaya, Indore |
| Vishwavidyalaya, Indore | Vishwavidyalaya, Indore | | |

# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
# Shri Vaishnav Institute of Technology and Science
# Choice Based Credit System (CBCS) in Light of NEP-2020
# M.Tech. in Civil with Structural Engineering
# (2021-2023)

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING &EVALUATION SCHEME | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | L | T | P | CREDITS |
| | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* | | | | |
| MTCE 1105(3) | DSE | Stability Theory in Structural Engineering | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

**Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

**UNIT V** **8 Hrs.**

Inelastic Buckling; Double modulus theory; Tangent modulus theory; Shanley's model; Eccentrically loaded inelastic column; Inelastic buckling of plates; Post buckling behavior of plates.

**Text Books:**


1. Timoshenko S., and Gere Theory of Elastic Stability, McGraw Hill Book Company, 2017
2. Stability of Structures, Ashwini Kumar, Allied Publishers Ltd., New Delhi, 1998.


**Reference Books:**


1. Gambhir, "Stability Analysis and Design of Structures", springer, New York , 2013.
2. Chajes, A., Principles of Structures Stability Theory, Prentice Hall, 1993.


**Chairperson**
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

**Chairperson**
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

**Controller of Examination**
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

**Joint Registrar**
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
# Shri Vaishnav Institute of Technology and Science
# Choice Based Credit System (CBCS) in Light of NEP-2020
# M.Tech. in Civil with Structural Engineering
# (2021-2023)

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING &EVALUATION SCHEME | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | L | T | P | CREDITS |
| | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* | | | | |
| MTCE 1205(1) | DSE | Structural Design of Foundation and Retaining Structures | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

**Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

**Course Educational Objectives (CEOs):**

1. To impart knowledge of geotechnical and structural design of different types of foundation.
2. To impart knowledge and retaining structures appropriate to the type of soil for different structures.

**Course Outcomes (COs):**

At the completion of this course, the student shall acquire knowledge and ability,

1. To select and design appropriate foundations based on various criteria,
2. To check the stability of various components of different types of foundations
3. To understand various recommendations regarding earthquake design of foundations
4. To select and design different types of retaining wall based on various criteria.

**Syllabus:**

**UNIT I** **8 Hrs.**

**Foundation Structures**- Rigid and Flexible Foundations; Loads and their effects; Design requirements; Geotechnical design; Design loads for foundations; Introduction to combined piled raft foundation (CPRF)

**UNIT II** **10 Hrs.**

**IS 456 Provisions for Design of Footings and Pedestals**: Basics of structural design of R.C. footings; Soil pressure on foundations; General planning and design of independent footings, minimum depth and detailing of steel requirements, checking for development lengths of main bars in footings.

**UNIT III** **10 Hrs.**

**Design of Raft Foundations**: Common types of rafts; Plain slab rafts for lightly loaded buildings, flat slab rafts for framed buildings; Mat foundation, beam and slab rafts, cellular rafts, piled rafts, annular rafts, grid foundation; Deflection requirements of beams and slabs in rafts; General considerations in design of rigid rafts; Types of loadings and choice of rafts

| | | | |
|---|---|---|---|
| **Chairperson** Board of Studies Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore | **Chairperson** Faculty of Studies Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore | **Controller of Examination** Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore | **Joint Registrar** Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore |

# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
# Shri Vaishnav Institute of Technology and Science
# Choice Based Credit System (CBCS) in Light of NEP-2020
# M.Tech. in Civil with Structural Engineering
# (2021-2023)

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING &EVALUATION SCHEME | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | L | T | P | CREDITS |
| | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* | | | | |
| MTCE 1205(1) | DSE | Structural Design of Foundation and Retaining Structures | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

**Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

**UNIT IV** **8 Hrs.**

**Effect of Earthquakes on Foundation Structures**: IS 1893 (2016) recommendations regarding layout of foundations; Classification of foundation strata, types of foundations allowed in sandy soils; Methods to prevent liquefaction and settlement.

**UNIT V** **8 Hrs.**

**Design of Cantilever and Basement Retaining Walls**: Introduction, earth pressure on rigid walls; Calculation of earth pressure on retaining walls; Design of ordinary R.C. cantilever walls; Design of basement walls

**Text Book:**


1. P.C. Varghese, Design of Reinforced Concrete Foundations, Prentice Hall India Learning Private Limited (2009)
2. Swami Saran, Analysis and Design of Sub structures, Oxford and IBH Publishing Co. PVT. Ltd, New Delhi 2018
3. Unnikrishnana Pillai and Devadas Menon, Reinforced Concrete Design, McGraw Hill Publishing Pvt. Ltd. 3rd Edition 2017.


**References Books:**


1. Tomlinson, Foundation Design and Construction, Pearson India; Seventh edition 2017.
2. Relevant IS Code


| Chairperson | Chairperson | Controller of Examination | Joint Registrar |
|---|---|---|---|
| Board of Studies | Faculty of Studies | Shri Vaishnav Vidyapeeth | Shri Vaishnav Vidyapeeth |
| Shri Vaishnav Vidyapeeth | Shri Vaishnav Vidyapeeth | Vishwavidyalaya, Indore | Vishwavidyalaya, Indore |
| Vishwavidyalaya, Indore | Vishwavidyalaya, Indore | | |

# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
# Shri Vaishnav Institute of Technology and Science
# Choice Based Credit System (CBCS) in Light of NEP-2020
# M.Tech. in Civil with Structural Engineering
# (2021-2023)

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING &EVALUATION SCHEME | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | L | T | P | CREDITS |
| | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* | | | | |
| MTCE 1205(2) | DSE | Instrumentation and Experimental Techniques | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

**Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

**Course Educational Objectives (CEOs):**

1. To learn about the calibration and sensitivity
2. To know in detail about Sensors
3. To know transducers and photo elasticity.
4. To understand the model analysis.

**Course Outcomes (COs):**

1. To develop the knowledge about used instruments in civil engineering
2. To have the knowledge about Moiré phenomenon.
3. To have the idea about the model analysis.

**Syllabus:**

**UNIT I** **8 Hrs**

Generalized measurement systems; calibration and sensitivity; Standards of measurements of various quantities

Detectors; Sensor system elements; transducer and devices; Different type of sensors; modifying and transmitting method

**UNIT II** **8 Hrs**

Construction details of temperature transducers; Vibration and shock measurement; Force and load transducers; Velocity transducers; Torque transducers; Pressure measurements and pressure transducers

**UNIT III** **8 Hrs**

Photo elasticity; Basic Optics and Polaris scope; Photo elastic effect; Stress-optic relations; Isoclinic; Iso-chromatics; Calibration of model; Separation techniques: Stress freezing techniques.

**UNIT IV** **8 Hrs**

Moiré phenomenon; Analysis of Moiré fringes; Measurement of strain; Displacement; Rotation and slope for in plane and out of plane problems.

**Chairperson**
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

**Chairperson**
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

**Controller of Examination**
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

**Joint Registrar**
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
## Shri Vaishnav Institute of Technology and Science
## Choice Based Credit System (CBCS) in Light of NEP-2020
## M.Tech. in Civil with Structural Engineering
## (2021-2023)

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING &EVALUATION SCHEME | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | L | T | P | CREDITS |
| | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* | | | | |
| MTCE 1205(2) | DSE | Instrumentation and Experimental Techniques | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

**Legends**: L - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

**UNIT V** **8 Hrs**

Model Analysis; Different types of mode; Law of structural similitude and non-dimensional analysis; Buckingham Pi theorem.

**Text Book:**


1. Murty, D.V.S, Transducer & Instrumentation Prentice Hall India Learning Private Limited; 2 edition (2011)
2. S. Sheel, Narosa , Instrumentation and Technique, Narosa Publishing House (2014)


References:


1. Dominique Placko , Fundamentals of Instrumentation and Measurement, ISTE LTD 2007.
2. Sadhu Singh, "Experimental Stress Analysis", Khanna Publishers, New Delhi, 2009
3. R S Sirohi, H C Radha Krishna, Mechanical Measurements, New Age International, 2013


| Chairperson | Chairperson | Controller of Examination | Joint Registrar |
|---|---|---|---|
| Board of Studies | Faculty of Studies | Shri Vaishnav Vidyapeeth | Shri Vaishnav Vidyapeeth |
| Shri Vaishnav Vidyapeeth | Shri Vaishnav Vidyapeeth | Vishwavidyalaya, Indore | Vishwavidyalaya, Indore |
| Vishwavidyalaya, Indore | Vishwavidyalaya, Indore | | |

# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
# Shri Vaishnav Institute of Technology and Science
# Choice Based Credit System (CBCS) in Light of NEP-2020
# M.Tech. in Civil with Structural Engineering
# (2021-2023)

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING &EVALUATION SCHEME | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | L | T | P | CREDITS |
| | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* | | | | |
| MTCE 1205(3) | DSE | Theory of Plates and Shell | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

**Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

**Course Educational Objectives (CEOs):**

1 The student will be able to analyse different shell structures.
2 The student will be able to design thin shell structures including domes, hyperbolic, parabolic, elliptic, and cylindrical shells.

**Course Outcomes (COs):**

1 Analyze and design thin shell structures including domes, hyperbolic, parabolic, elliptic and cylindrical shells
2 Formulate Finite Element Equations for solution of the structural response of plate bending problems and obtain solutions to shell structures

**Syllabus:**

**UNIT I** **8 Hrs**

**Theory of Plates:** Pure bending of plates-Differential equations of equilibrium; Theory of small deflections of laterally loads plates; Boundary conditions; Moment curvature relationship

**UNIT II** **8 Hrs**

Analysis of rectangular plates; Navier's and Levy solutions; Exact theory of plates; Symmetrical bending of circular plates; Continuous rectangular plates

**UNIT III** **8 Hrs**

Special and approximate methods of theory of plates; Singularities; Use of influence surfaces; Strain energy methods; Experimental methods.

**UNIT IV** **8 Hrs**

**Theory of Shells:** Classification of shells; Gaussian curvature; General theory of cylindrical shells; Membrane theory and bending theory for cylindrical shells; Long and short shells; Shells with and without edge beams.

**UNIT V** **8 Hrs**

Equation of equilibrium for shells of surface of revolution; Spherical shells; Membrane theory for shells of double curvature; cylindrical shells; Hyperbolic-parabolic shells; Funicular shells

| Chairperson | Chairperson | Controller of Examination | Joint Registrar |
|---|---|---|---|
| Board of Studies | Faculty of Studies | Shri Vaishnav Vidyapeeth | Shri Vaishnav Vidyapeeth |
| Shri Vaishnav Vidyapeeth | Shri Vaishnav Vidyapeeth | Vishwavidyalaya, Indore | Vishwavidyalaya, Indore |
| Vishwavidyalaya, Indore | Vishwavidyalaya, Indore | | |

# Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
# Shri Vaishnav Institute of Technology and Science
# Choice Based Credit System (CBCS) in Light of NEP-2020
# M.Tech. in Civil with Structural Engineering
# (2021-2023)

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING &EVALUATION SCHEME | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | L | T | P | CREDITS |
| | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* | | | | |
| MTCE 1205(3) | DSE | Theory of Plates and Shell | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

**Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

**Text Book:**

1. S Timoshenko, Theory of Plates and Shells, McGraw Hill Co. Ltd. 2017
2. S.S Bhavikatti, Theory of Plates and Shells, New age publication Delhi, 2019

**Reference Books-**

1. Wilhelm Flügge, Stresses in Shells, Springer Berlin Heidelberg, 2013
2. G.S.Ramaswamy, Design and construction of concrete shell roofs, CBS Publishers& Distributors, 2005.

**Chairperson**
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

**Chairperson**
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

**Controller of Examination**
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

**Joint Registrar**
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore